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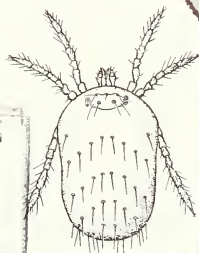
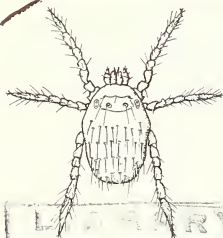
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Chiggers

HOW TO FIGHT THEM

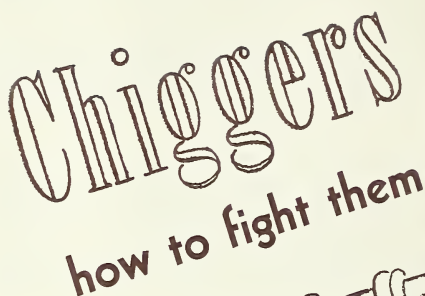


LEAFLET NO. 403

U. S. DEPARTMENT OF AGRICULTURE

Chiggers

how to fight them



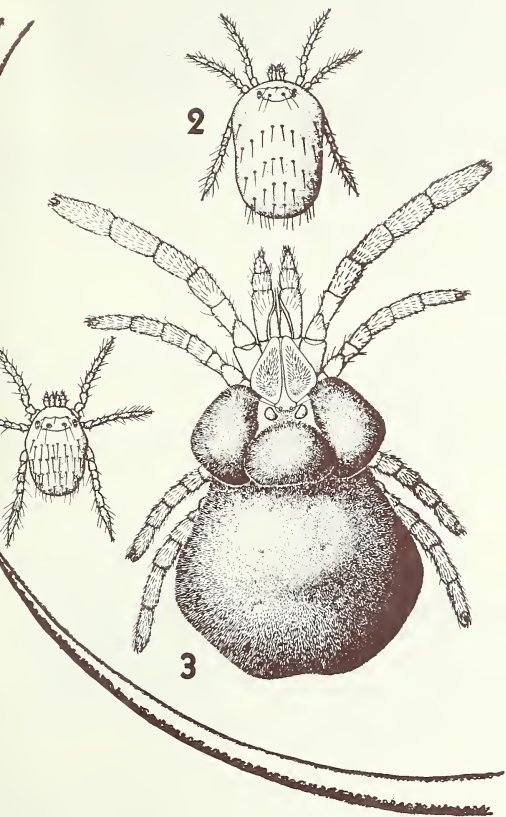
Chiggers, sometimes called red bugs, make up a family of mites. Many species are found in the United States. Two of these commonly attack man.¹

Chigger bites cause intense itching and small, reddish welts on the skin. You may notice these symptoms in the summer after working in the garden, walking in the woods or fields, picking berries, or mowing the lawn. The symptoms may be your only way of knowing that you have been in an infested place, because chiggers are so small that most persons cannot see them without a magnifying glass.

The pests occur in South Dakota, Nebraska, Iowa, Illinois, Indiana, Ohio, and Pennsylvania, and in all States farther south. They are especially troublesome in the South.

You can use a repellent to prevent attacks by chiggers if you go in an area known to be infested. If you get in an infested area without knowing it, you can reduce itching by bathing and by applying an antiseptic and a local anesthetic to the welts. You can get rid of an infestation by spraying or dusting the infested area with an insecticide.

¹ *Eutrombicula batatas* and *E. alfreddugèsi*.



A Species of Chigger
(*Eutrombicula batatas*)

1. Unengorged larva
2. Engorged larva
3. Adult

HOW TO PREPARE SPRAYS FOR CHIGGER CONTROL

Forms in which insecticides may
be purchased

Amount of purchased product
to mix with—

	5 gallons of water	100 gallons of water
Chlordane or Toxaphene		
Emulsifiable concentrate:		
40 percent.....	2 cups.....	2½ gallons.
50 percent.....	1¾ cups.....	2 gallons.
65 percent.....	1¼ cups.....	1½ gallons.
Wettable powder:		
25 percent.....	1½ pounds.....	32 pounds.
42 percent.....	1 pound.....	20 pounds.
Lindane		
Emulsifiable concentrate:		
20 percent.....	½ cup.....	2½ quarts.
25 percent.....	⅓ cup.....	2 quarts.
Wettable powder: 25 percent.....	3.2 ounces.....	4 pounds.

Chlordane or Toxaphene

Emulsifiable concentrate:

40 percent.....	2 cups.....	2½ gallons.
50 percent.....	1¾ cups.....	2 gallons.
65 percent.....	1¼ cups.....	1½ gallons.

Wettable powder:

25 percent.....	1½ pounds.....	32 pounds.
42 percent.....	1 pound.....	20 pounds.

Lindane

Emulsifiable concentrate:

20 percent.....	½ cup.....	2½ quarts.
25 percent.....	⅓ cup.....	2 quarts.

Wettable powder: 25 percent..... 3.2 ounces..... 4 pounds.

Repellents

Repellents

Do not treat underwear with a repellent. Treated underwear may irritate the skin.

Do not apply a repellent to stockings or other clothing that contains rayon. Repellents are damaging to rayon and to some other manmade fibers; nylon is not damaged.

Do not let repellents touch painted surfaces or objects made of plastic materials, such as fountain pens, fishing rods, watch crystals, or frames of eyeglasses.

Insecticides

Chlordane, toxaphene, and lindane are poisons. Handle them with care. Wear heavy clothing when you apply them. If an emulsifiable concentrate spills on your skin, wash it off at once with soap and water.

Avoid breathing the spray or dust. Spray or dust with the wind.

Keep children and pets out of a treated area until the spray dries.

After treating a lawn, sprinkle it with water to wash the insecticide from the grass into the soil. This reduces the hazard to children and pets, and does not reduce the effectiveness of the treatment.

Do not treat areas where livestock feed or graze.

Do not apply insecticides where they will contaminate fruit or vegetables.

To avoid killing fish, do not apply toxaphene along the margins of lakes or ponds, or along the banks of streams. Lindane or chlordane may be used in these places, but avoid contaminating the water.

Do not apply insecticide to your skin or your clothing to repel or kill chiggers; use only recommended repellents in this way.

Chigger facts

• Development

Adult chiggers pass the winter in protected places and become active in the spring. A few days after the females become active they lay their eggs in sheltered places. These eggs hatch into the first generation of the year.

The young chigger is known as a larva. It is the troublemaker. It is parasitic, feeding on man and animals. The larva transforms to a nymph, and the nymph to an adult. Neither the nymph nor the adult is a parasite.

Chiggers raised experimentally complete the life cycle—from egg to egg—in about 50 days.

In southern Florida and southern Texas, chiggers may be present throughout the year. In other States, the chigger season begins in May, June, or July and lasts until September or the first frost.

light red. They are less than 1/150 inch in diameter. The bodies are hairy. A larva has three pairs of legs. Its mouth parts include two pairs of grasping palps, which are provided with forked claws.

The nymphs and adults have four pairs of legs. The bodies are hairy, about 1/20 inch long, and usually a brilliant red. There is a marked constriction in the front part of the bodies.

• Feeding Habits

Young chiggers attach themselves to the skin of people or to the skin of domestic animals, wild animals (including reptiles), poultry, and birds.

Before settling down to feed, chiggers scurry around for a suitable location. The preferred locations on people are those parts of the body where clothing fits tightly over the skin, or where the flesh is thin, tender, or wrinkled.

Like ticks, they attach themselves by inserting their mouth parts in the skin—frequently in hair follicles or pores. They inject a fluid into the skin;



O-RCH-74-A

Applying repellent to socks and cuffs of trousers for protection against chiggers.



O-IRE-100

Spraying insecticide over lake shore picnic area for chigger control.

come engorged in about 4 days. Then they drop off and change to nymphs.

Nymphs and adults feed on insect eggs, small insects, and organisms found on or near woody decaying substances.

• Effects of Attack

The fluid injected into the skin by the chiggers causes reddish welts to appear. It also causes swelling, itching, and (in some persons) fever. Chigger bites have a more severe effect on some persons than on others. Persons who are exposed repeatedly may develop immunity to the bites.

A chigger attached in a pore or at the base of a hair may be so enveloped in swollen skin that it appears to be burrowing into the skin. This fact sometimes leads persons to believe, mistakenly, that chiggers embed themselves in the skin, or that welts contain chiggers.

Any welts, swelling, itching, or fever will develop within 24 hours after the attack. Itching may be intense and, if nothing is done to relieve it, may con-

chiggers occurring in large numbers can cause serious injury to poultry. They sometimes cause the death of young chickens.²

Chiggers are not known to transmit any disease in this country. In some parts of the world, particularly in parts of the Far East, they transmit scrub typhus, a serious disease similar to spotted fever. In this country spotted fever is transmitted by ticks.

• Infested Places

Chiggers are most often found in low, damp places where vegetation is rank—for example, berry patches, orchards, woodlands, and margins of lakes and streams. But some species are adapted to living in drier places where vegetation is low, and heavy infestations may be found in lawns, golf courses, and parks.

You cannot tell by looking at a place whether it is infested. Chiggers may be numerous in a place one year, and scarce or absent another year; and they occur in some places only for short periods.

² See Leaflet 383, Poultry Mites: How To Control Them, which may be obtained from the U. S. Department of Agriculture, Washington 25, D. C.

Using Repellents

Before going into a place where chiggers may be, protect yourself against them by using a repellent.

Several highly effective repellents are available. They do more than repel. Chiggers that attempt to crawl over clothing or skin areas treated with the materials are killed.

Repellents can be used to obtain either temporary or long-lasting protection. Used the first way, they are effective several hours; the other way, several days.

Temporary Protection

The following repellents are effective against chiggers: Diethyltoluamide, dimethyl phthalate, dimethyl carbate, ethyl hexanediol, and benzyl benzoate. The first four are also effective against mosquitoes and some other insects. Go to a drug store, hardware store, or any other store where insecticides are sold. Ask for any one of the repellents by name. You may be offered a product that contains two or more of the repellents. Such a product is acceptable. The repellents are effective individually or in combination.

Apply the repellent to clothing by rubbing it on, by applying it directly from the bottle, or by spraying it on. Rayon and some other manmade fabrics may be harmed by the repellent; nylon, cotton, and wool will not be harmed.

Apply the repellent lightly, with the fingers, to the arms or legs if they are not covered by clothing.

Treat socks or stockings after you put them on. Apply a ring of repellent just above your shoe tops. Treat all the way around the upper edges of the hose. Cotton and wool socks absorb repellent better than other materials and are preferred for wearing in chigger-infested places.

In treating other clothing, apply the repellent along the edges of all openings, inside and outside. Besides treating openings that are buttoned, zippered, or otherwise fastened, treat such openings as the following:

In trousers and slacks.—Cuffs and waistband.

In shirts and blouses.—Cuffs (or armholes) and neckband.

In skirts.—Hem and waistband.

In dresses.—Neckline and skirt hem; cuffs, sleeve hems, or armholes.

To rub a repellent on clothing, pour about a dozen drops in the palm of one hand, rub the hands together, then rub lightly the parts of the clothing to be treated.

To apply it directly from the bottle, press the bottle opening against the clothing and move it over the parts to be treated.

To spray a repellent on clothing, use an ordinary hand sprayer—the kind used in homes for applying fly sprays.

Do not saturate the cloth with repellent. If a garment is moist with repellent along all openings—inside and outside—it has been adequately treated.

If the infested place is one in which the vegetation is low, if you intend merely to walk in it, and if you are wearing trousers or slacks, you need only apply repellent to the cuffs of the trousers or slacks and to socks or stockings.

Long-Lasting Protection

Long-lasting protection against chiggers is needed chiefly by men who work regularly in infested areas and by others—such as campers, hikers, and hunters—who may be in such areas several days at a time.

The protection is obtained by impregnating clothing with a diluted repellent or by spraying an undiluted repellent on the clothing.

Use dimethyl phthalate or benzyl benzoate.

Impregnating the Clothing

Two ounces of repellent in a solution or emulsion are needed to treat an ordinary set of work clothes—shirt, trousers (or overalls), and socks.

Prepare a solution by adding the repellent to 1 quart of any dry-cleaning fluid.

Prepare an emulsion as follows: (1) Put $\frac{3}{4}$ ounce of soap powder (but not synthetic detergent) or thinly sliced soap in 1 quart of water and stir until the water is soapy. (2) Take 1 cupful of the soapy water, add the repellent, and stir vigorously. (3) Pour this into the rest of the soapy water and stir vigorously.

Multiply these quantities by 2 if you are going to treat 2 sets of clothes, by 3 if you are going to treat 3 sets, and so on.

Place the clothes in a container and slowly pour on the solution or emulsion. Work the clothes around in the liquid. Wet them uniformly but do not let them soak. Wring them and hang them out to dry.

Dimethyl phthalate gives protection for at least a week, unless it is washed out of the clothing. Laundering washes out the repellent; a heavy rain may do so. Repellent in trousers and socks is washed out if the wearer wades through water. Re-treat the clothing after each laundering.

Benzyl benzoate is effective longer than dimethyl phthalate, and it washes out less readily. It gives protection even after clothing has been laundered twice. Clothing that has been laundered twice since being treated should be re-treated.

In addition to providing complete protection against chiggers, either of these treatments gives considerable protection against ticks.

Chigger facts

• Development

Adult chiggers pass the winter in protected places and become active in the spring. A few days after the females become active they lay their eggs in sheltered places. These eggs hatch into the first generation of the year.

The young chigger is known as a larva. It is the troublemaker. It is parasitic, feeding on man and animals. The larva transforms to a nymph, and the nymph to an adult. Neither the nymph nor the adult is a parasite.

Chiggers raised experimentally complete the life cycle—from egg to egg—in about 50 days.

In southern Florida and southern Texas, chiggers may be present throughout the year. In other States, the chigger season begins in May, June, or July and lasts until September or the first frost.

• Appearance

In the larval stage chiggers are orange-yellow or light red. They are less than $\frac{1}{16}$ inch in diameter. The bodies are hairy. A larva has three pairs of legs. Its mouth parts include two pairs of grasping palps, which are provided with forked claws.

The nymphs and adults have four pairs of legs. The bodies are hairy, about $\frac{1}{16}$ inch long, and usually a brilliant red. There is a marked constriction in the front part of the bodies.

• Feeding Habits

Young chiggers attach themselves to the skin of people or to the skin of domestic animals, wild animals (including reptiles), poultry, and birds.

Before settling down to feed, chiggers scurry around for a suitable location. The preferred locations on people are those parts of the body where clothing fits tightly over the skin, or where the flesh is thin, tender, or wrinkled.

Like ticks, they attach themselves by inserting their mouth parts in the skin—frequently in hair follicles or pores. They inject a fluid into the skin;

Spraying the Clothing

In spraying to obtain long-lasting protection, you apply the repellent to the entire garment—not just to the openings. Using a hand sprayer, apply a mist of undiluted dimethyl phthalate or benzyl benzoate to the inside and outside of the clothing; continue until the clothing is slightly moist, but not wet. Do not apply more than 2 ounces of repellent to a set of work clothes. Let the clothes dry for several hours before wearing them.

It is easier to spray clothes than to put them through the impregnation treatment, but it is difficult to apply the spray uniformly. Also, sprayed-on repellent loses its effectiveness a few days sooner than repellent applied by impregnation, and it is washed out more easily.

Reducing the Itching

If you get in a chigger-infested place without the protection of a repellent, attack is almost certain. You may not know that you have been attacked until welts appear on the body and itching begins.

Take a bath as soon as possible. Apply a thick lather, then rinse it off. Do this several times. The bath kills most, or all, of the attached chiggers, and any others that may not yet be attached.

Next, apply a dab of antiseptic to each of the welts. This will kill any chiggers not killed by the bath, and it aids in preventing infection.

Destroying the chiggers reduces the itching, but does not stop it. The fluid injected by the chiggers causes the itching. No practicable way to remove it has been found, and no treatment is known that will give permanent relief from the itching.

To get temporary relief, apply a local anesthetic. The following formula has been found helpful:

Benzocaine, 5 percent.
Methyl salicylate, 2 percent.
Salicylic acid, 0.5 percent.
Ethyl alcohol, 73 percent.
Water, 19.5 percent.

Take the formula to your druggist for compounding. Apply the material to each welt with a piece of cotton. One treatment gives relief for an hour or longer. Repeat the treatment as often as necessary.

Some persons who have had experience with chiggers can detect an attack without the evidence of welts and itching. They feel the slight irritation that is produced when the chiggers begin to attach, and they know what is causing it. They may feel the movement of chiggers as they crawl on the body seeking a place to attach.

If you become aware of sensations that cause you to suspect the presence of chiggers, examine the skin. Look carefully at the bases of hairs. You may not be

able to see the chiggers, but you may be able to see small reddish spots where they are attaching.

The more quickly you detect the chiggers, the better results you will get from the soapy bath. If you can take the bath within an hour after the chiggers get on you, it will probably kill most of them before they attach.

Using Insecticides

You can wipe out a chigger infestation by applying an insecticide spray or dust in the infested area. Apply the spray or dust to grass, logs (and the ground around them), and ground litter. Apply it around bushes and high weeds.

The recommended insecticides are chlordane, toxaphene, and lindane. They can be purchased in insecticide supply stores, and are generally available in the form of emulsifiable concentrates, wettable powders, and dusts. Select any one of the insecticides, and decide in what form you wish to purchase it.

An emulsifiable concentrate or wettable powder is mixed with water to make a spray. A dust is ready to use when purchased.

An emulsion spray, prepared by mixing an emulsifiable concentrate with water, usually gives better results than a wettable-powder spray or a dust.

Locating the Chiggers

Before you start applying an insecticide, have a clear idea of where the chiggers are. If the area is a large one, such as a picnic ground, a golf course, or a large lawn, it may be advisable to make a simple survey. The chiggers may be concentrated in a few spots within the area. Treating the trouble spots is quicker and less expensive than treating the whole area.

Place a piece of black cardboard edgewise on the ground. Observe it for a few minutes. If chiggers are present, they will climb to the top edge and congregate there. Make the test in about a dozen spots over the area. Pick out spots that have different kinds of cover, such as solid growths of grass, tufts of grass, dead leaves, and decaying twigs. Remember, you are chigger hunting; you should be protected by a repellent.

If experience has already shown that the entire area is infested, go ahead and treat all of it, without a survey; or, if you prefer, treat only the parts in which control is especially desired, such as grass and shrubbery around picnic tables or lawn chairs.

Sprays

Emulsifiable concentrates and wettable powders contain various percentages of insecticide. The per-

the fluid dissolves the tissues; the chiggers suck up the liquefied tissue.

When they attach themselves to animals, they become engorged in about 4 days. Then they drop off and change to nymphs.

Nymphs and adults feed on insect eggs, small insects, and organisms found on or near woody decaying substances.

• Effects of Attack

The fluid injected into the skin by the chiggers causes reddish welts to appear. It also causes swelling, itching, and (in some persons) fever. Chigger bites have a more severe effect on some persons than on others. Persons who are exposed repeatedly may develop immunity to the bites.

A chigger attached in a pore or at the base of a hair may be so enveloped in swollen skin that it appears to be burrowing into the skin. This fact sometimes leads persons to believe, mistakenly, that chiggers embed themselves in the skin, or that welts contain chiggers.

Any welts, swelling, itching, or fever will develop within 24 hours after the attack. Itching may be intense and, if nothing is done to relieve it, may con-

tinue a week or longer. Scratching a bite may break the skin and result in infection.

Chiggers attacking in large numbers can cause serious injury to poultry. They sometimes cause the death of young chickens.²

Chiggers are not known to transmit any disease in this country. In some parts of the world, particularly in parts of the Far East, they transmit scrub typhus, a serious disease similar to spotted fever. In this country spotted fever is transmitted by ticks.

• Infested Places

Chiggers are most often found in low, damp places where vegetation is rank—for example, berry patches, orchards, woodlands, and margins of lakes and streams. But some species are adapted to living in drier places where vegetation is low, and heavy infestations may be found in lawns, golf courses, and parks.

You cannot tell by looking at a place whether it is infested. Chiggers may be numerous in a place one year, and scarce or absent another year; and they occur in some places only for short periods.

² See Leaflet 283, Poultry Mites: How To Control Them, which may be obtained from the U. S. Department of Agriculture, Washington 25, D. C.

centages shown in the accompanying chart are those most commonly found in retail products.

To prepare a spray, mix one of the products with water in the proportion indicated in the chart. Apply the finished spray as follows, but do not treat areas where livestock feed or graze:

Small areas.—To treat a lawn, campsite, or other small area, use a cylindrical compressed-air sprayer or a knapsack sprayer. Apply $2\frac{1}{2}$ to 3 quarts per 1,000 square feet (25 to 35 gallons per acre).

Large areas.—To treat a park, golf course, or other large area, use a power sprayer. To get uniform coverage, apply twice as much spray material as you would with a small sprayer, but do not add insecticide. Double the amount of spray material by adding water. Apply 50 to 70 gallons per acre.

An emulsion spray prepared and applied according to these recommendations is effective 4 to 8 weeks; a wettable-powder spray, 2 to 6 weeks. A spray is considered effective for a stated period if few or no active chiggers can be found in the treated area during that period.

Dusts

Apply 5-percent chlordane or toxaphene dust at the rate of 40 to 50 pounds per acre (1 to $1\frac{1}{4}$ pounds per 1,000 square feet), and 1-percent lindane dust at the rate of 25 to 50 pounds per acre (10 ounces to $1\frac{1}{4}$ pounds per 1,000 square feet). A dust treatment is effective 1 to 4 weeks.

Dusts can be applied with any equipment that is used for dusting plants. A rotary hand duster is excellent for treating small areas. A power duster is better for large areas. Do not treat areas where livestock feed or graze.

If you have any questions about the repellents or insecticides discussed in this leaflet, consult your county agent or an entomologist in your State extension service or experiment station; or write to the Entomology Research Division, Agricultural Research Service, U. S. Department of Agriculture, Plant Industry Station, Beltsville, Md.

This leaflet was prepared by the Entomology Research Division, Agricultural Research Service. It supersedes Leaflet 302, Chigger Control.

Washington, D. C.

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